

State of Space 2019 Address

Good morning and thank you all for joining us today. It's a pleasure to be with you and share some thoughts on the future of something that the Space Foundation and I are very passionate about – our boldest and most formidable frontier facing humanity...space.

Since its founding in 1983, the Space Foundation has dedicated itself to making the public more aware of the rewards and opportunities that space exploration brings to all of us.

During our three decades, the Space Foundation is proud of having established itself as the global resource where the space community – from the United States and around the world – can share bold ideas and seek common ground for collaboration.

No one can do space alone. Partnerships are key to collective successes, and the Space Foundation will always facilitate those into being.

Nowhere can you see a bigger display of those relationships than at our annual Space Symposium at The Broadmoor in Colorado Springs. That first gathering, which 35 years ago, started as just a couple of hundred people, has grown today into an assembly of more than 9,000 space leaders from around the world – all assembled to share their insights, visions and opportunities for space.

With that much talent focused in one spot, it brings partnerships and diversity to the forefront for all to see. Those partnerships and diversity also bring strength, capabilities and promise. Not just for what it enables us to do today, but for the future we are all working to build.

But the Space Foundation is much more than the host of the four epic days in Colorado Springs every April. For those of you not from Colorado, “epic” is a term we use to describe the most unbelievable champagne powder days on the ski slopes, and it is an appropriate adjective for the Symposium. We are an organization that operates 365 days a year to inspire, educate, connect and advocate on behalf of the global space community. That is what I want to discuss with you this morning.

I think 2019 is a crossroads year for the space community. Let me explain why.

First, as a country and as a global community, we will celebrate the greatest achievements of the Apollo era. But as we celebrate these past triumphs, we need to be mindful that the Moon landing was a down payment on the opportunities that are unfolding today for our space future.

Today we are on the cusp of a new venture to the Moon and beyond. These missions will carry an even more diverse group of people to do even bolder things that we will celebrate for generations to come.

Today's "space race" is being waged by entrepreneurs and commercial enterprises instead of rival nation states and Cold Warriors. This new and inspiring competition is bringing technological revolution faster to missions and the marketplace than anything imagined in the Apollo era.

Here's the proof...

In 1969, the Space economy could be measured by looking at the expenditures of the Pentagon, NASA, a few intelligence agencies and a similar small handful of telecommunications providers that were in their infancy...a very nationalistic, going it alone approach.

Fifty years later, as our annual Space Report documents, a nearly \$400 billion space economy exists that touches every corner, our infrastructure and way of life on the planet. Dozens of nations are operating in space, rather than just two, and the competition that all of those actors are generating is providing greater value to life on Earth every day.

It's not a reach to say that today's space future is lifting off and the actions of the past year reinforce that fact.

2018 was a record-breaking year for launches with 114 occurring from nearly a dozen different countries.

The Small Sat revolution continued to unfold globally with deployments around the Earth and now even Mars – further proving them to be as cost-effective as they have been effective in their use. Which is why you see our space competitors from Russia, China, Israel and India making greater effort to grow their market share.

With more of these cost-efficient deployments on the horizon, our collective abilities to master these small-sized technological marvels will deliver even more space-based capabilities for everything from communications, banking and intelligence delivery to GPS location and geospatial services.

Adding to the breakthroughs in 2018, for the first time in a generation, we have a new heavy lift rocket – Space X's Falcon Heavy, which took Elon's Tesla Roadster for the ultimate road test, but not before having its two boosters return to the Florida coastline and land mere miles from where they launched.

Not be outdone in remarkable images, ULA, Lockheed Martin, Aerojet Rocketdyne, DLR and others put us back on Mars with the InSight Lander, which is giving us our first look below the surface of the red planet.

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Then there are the two commercial crews that NASA announced this past year that will return Americans to orbit from American soil for the first time in almost a decade. Two remarkable American companies, Boeing and SpaceX, with their Starliner and Dragon vehicles, will once again showcase American ingenuity and innovation as the American public has come to expect and deserve.

Also, in 2018, the successful suborbital flight of Virgin Galactic's SpaceShipTwo this past December has brought us to the cusp of putting paying passengers in seats that will give them the ultimate "E" ticket Disney ride and view of their lives.

It only seems appropriate that we would have a record-breaking year on the eve of some of Apollo's greatest anniversaries. But there are critical things we as a space community have to do to ensure these trends continue.

For as proud as the space community can be for our recent accomplishments, all of us remember the setbacks of the immediate post-Shuttle era. No one wants to repeat that experience. Space coasts in Florida, Virginia, California and even Alaska should be boom towns, not ghost towns. Which is why we should not forget our past downturns.

And that is our community's crossroads for 2019.

People go where there is hope, growth and opportunity. Space is that place for many. We know it is not without risk or challenge, but no market or frontier was ever opened without taking those tough considerations in hand.

Critical investments by the public and private sectors in this country and others have made space the hottest of markets. Furthermore, policy directives and regulatory approaches brought about by the National Space Council, NASA, individual states, the Commerce Department, FAA, the U.S. Congress and others are making space a place where the "open for business" sign is on 24-7.

But to keep those lights on and doors open, there are three core challenges the Space Community needs to proactively engage if we are to secure our future. So,

Our first challenge is how to grow the roots of a National Space Force.

Ever since President Trump announced his intention to create it, the Space Force has spurred a lot of debate. There are many valid opinions on all sides of this issue but the most positive is the fact that across every military, intelligence, civilian and commercial constituency there is agreement that access to space, protection of our orbital assets and leadership in the space domain is a national priority.

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Space today is a critical infrastructure where our national and economic security interests are fundamentally dependent. Today, all infrastructure in this country and on every other continent is touched or covered by space technologies, assets or capabilities.

A day without space puts our infrastructures, communities and commerce at risk.

Protecting those capabilities is a bigger task than a separate military force or single command structure. It is a cross-functional team of talent from military, public and private sectors, with capabilities far beyond launch pads, control rooms, orbits and ground stations.

The National Space Force I am talking about protects our national interests and infrastructures; creates new jobs and economic opportunity for more people; and secures our position as the lead pioneer of the space frontier.

Today's National Space Force needs to be anchored in our classrooms. Without skilled teachers capable of inspiring and developing the next generation of STEM talent, there will be no lift off for us here on this planet, or beyond it.

It frustrates me that according to the Programme for International Student Assessment (PISA), the largest assessment authority, which every three years measures reading ability, math and science literacy and other key skills among 15-year-olds in dozens of developed and developing countries, the U.S. placed an unimpressive 38th out of 71 countries in math, and 24th in science in 2015.

Among the 35 members of the Organization for Economic Cooperation and Development, which sponsors the PISA initiative, the U.S. ranked 30th in math and 19th in science.

My friends you can't expect to be the leader in space if you're in the middle of the pack of the disciplines that put you into orbit. That has to change.

At the Space Foundation, STEM education is a core mission of our everyday operations. Using space, we craft curricula and programming for teachers to bring STEM subjects to life in their classroom. We also recognize and recruit talented educators to mentor others in their school systems on how to help students realize a life-long love of STEM learning that will allow them to solve problems on this planet and explore the possibilities beyond it.

Our Teacher Liaison program is a national model for this important effort. These are master educators from around the world who use space as a vehicle to excite students about STEM education. This international network shares ideas, lessons, activities and best practices for the classroom, all designed to inspire tomorrow's explorers.

But there is still room for the space community to be far more aggressive in opening its doors to their communities' schools, educators, students and families. We have a responsibility to lead in any and every way we can.

While there is phenomenal value in engaging students in their undergraduate and graduate careers with internships and work-study relationships, a bigger premium must be invested in engaging students much earlier in elementary and middle school to show them how STEM, as well as space, can shape their futures. Get them involved early...and often.

The Space Foundation believes that the topic of space is the "hook" to excite students about STEM and start filling the K-12 STEM pipeline to create the much-needed STEM workforce.

To that end, the Space Foundation is positioning itself to become the premier space-focused STEM education organization in the world by establishing the Space Foundation Center for Education and Innovation. This Center will develop best practices in formal and informal education through rigorous research and will pioneer innovative education methods that will deliver the STEM workforce our country and economy require if we are to remain a world leader here on Earth as well as space.

The Center will encompass a major expansion of our world-class facility in Colorado Springs to provide a more impactful in-person experience. This expansion will also enable the Space Foundation to provide consulting services to assist others in establishing education programs as well as an innovation center dedicated to expanding space commerce and entrepreneurship.

Beyond growing the roots of a Space Force in education, another core challenge for the space community is invigorating the competition that comes from space. Therefore,

The second challenge is building and measuring space commerce.

Exploration in all its forms has always had commerce as its permanent shadow. Every country, especially our own, has a heritage of entrepreneurship, and space exploration is no different.

Kevin O'Connell, who serves as the Director of the Office of Space Commerce, recently shared that his boss, U.S. Commerce Secretary Wilbur Ross challenged him to see to it that today's nearly \$400 billion space economy gets to \$1 trillion as soon as possible.

I can say without hesitation the space community is up for that challenge, which is why the Commerce Department's efforts to address regulatory barriers and challenges has been so valuable to the growth we are seeing today.

And so is the investment that the Commerce Department is making through the Minority Business Development Agency (MBDA) to the Space Foundation with its recent grant to enable more minority enterprises to join the space community.

The workshops we now have underway around the United States are focused on giving those entrepreneurs and innovators the information, access and networks they need to be a part of one of the most dynamic business communities anywhere.

Enhancing the diversity of today's and tomorrow's space commerce partners not only brings more competition into the marketplace; it creates greater opportunity for all – a premise which we at the Space Foundation wholeheartedly believe in.

Commerce is always evolving and so should the way we measure it.

For a decade now, the Space Foundation has produced the annual Space Report – a comprehensive guide to global space activity. This product has been a cornerstone to public understanding of what is happening around the world in space. But cornerstones are meant to be built upon.

Which is why going forward, we will be issuing the Space Report quarterly. Like other economic sectors that measure economic performance, such as manufacturing, construction and consumer confidence, we too, will be issuing reports of what is happening in the Space Economy.

As we start this transition, we will pay particular focus on the global space economy; products and services; the workforce; and infrastructure. If we are going to recognize space as the economic opportunity engine it has become, we need to put forward measures that tell the story.

As our quarterly reporting evolves, so will our research and analysis efforts. Beginning this year, we will also be looking for partners to help us take a closer look at the space economies in all 50 U.S. states and territories and become more predictive in our analysis.

While the states have been described as “laboratories of democracy,” they are also laboratories of commerce, with each bringing something unique to the marketplace.

Today we have 10 spaceports around the country with more states looking at ways to participate in the space economy. If our nation is to truly lead in space, as the American public and much of the world expects, we must have a better understanding of what is happening at the state and even local levels of our country.

As we begin this effort in 2019, collaborating with a number of partners, we expect to find some surprises. But one thing we have already discovered in the decade that we've produced the Space Report is that traditional economic measures of commerce, careers and investments do not necessarily apply.

Using a range of available data sets, and seeking new ones, we want to better define what those measures should be and share those observations.

The final core challenge I want to share today is our need to better translate and return our space investments to lives here on Earth. Accordingly,

Our third challenge is better telling our Space Story.

No one can compare to the space community when it comes to the sights, sounds and discoveries we generate. We truly are unparalleled in that arena, but as groundbreaking as every one of our achievements may be, we should always be working “overtime” in explaining the difference space makes to our everyday lives.

Over the past decade or more, NASA has done a tremendous job in these areas, using multimedia efforts to engage the public and showcase the returns their taxpayer investments provide. Administrator Bridenstine has also more than demonstrated his own capabilities to be a proactive and forthright messenger for those same efforts.

But as a whole, the space community needs to do a far better job of telling the public, “Why,” when we boldly go where we’ve never been before.

Answering the “Why,” is a challenge with any issue, but when it involves complex subjects like physics, orbital mechanics and any number of other STEM-related disciplines, the challenge of relating to the “real-world” and all of its real problems becomes even tougher.

As much as we need a STEM-ready, willing and able workforce, we also need to make sure we are being transparent and approachable in telling the story of our pursuits.

Fortunately, the imagery and data we collect about our planet is empowering more people to see and understand that what we do in space, can help us better address conditions here on Earth.

These kinds of efforts have to go far beyond technical journals and published papers for professional societies. If the information we share is not reflected in the eyes, ears and minds of students, teachers and taxpayers, our community will never be all that it can be.

That’s one of the reasons behind our new podcast series, which we call Space4U.

Starting this month, the Space Foundation will be sharing conversations with the diverse men and women from this country and around the world who are making today’s space exploration possible.

Think of it this way...

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If any one of us could have had a one-on-one conversation with Robert Goddard as he was launching his first rockets, or Katherine Johnson as she and the other human computers were doing their computations for Mercury, Gemini and Apollo missions, or with Carl Sagan before he shared 'Cosmos' with the world, wouldn't you do it?

Today, we have a new generation of Goddards, Johnsons and Sagans emerging in the space community. We need their stories too.

As many of you may recall, when the Voyager spacecraft was launched in 1977, it had on board a gold-plated record of sounds and images to show what life and culture on Earth was like.

Nearly 42 years after that launch, we have far better means, technologies and abilities to share the next great human adventure in space and I challenge the space community to do it without hesitation.

Starting this month, the Space Foundation is inviting the entire space community, here in the United States and around the world to create a more space aware and a far more space-invested public.

We have initiated a thematic calendar to highlight the diversity of what the entire space community does in space and earth science, as well as in astronomy, robotics, commerce and other fields. Each month, we will showcase the diversity of talent, innovation, breakthroughs and achievements that are happening in all of these areas.

If we don't step forward to tell these stories and educate the public of the value and difference, we make every day, who will?

That is why we need to proactively answer, "Why?" in all that we do.

In closing, history tells us that when we pay attention to places, we've never explored before, we discover something new. Not just about that location and its surroundings, but also, about ourselves.

Those are risks worth taking and we must acknowledge discoveries that matter to our future.

Those are the stories we need to share beyond technical reports and data-driven analyses. They are the conversations we owe each other as taxpayers, investors, stakeholders and believers in the next great human adventure in space.

That's the vision of the Space Foundation. We inspire, educate, connect and advocate on behalf of the global space community. And we want every student, teacher and taxpayer to see themselves reflected in our space exploration pursuits.

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For as much as we have to celebrate in this year of Apollo's greatest achievements, the fact is, we're just beginning with the next great human adventure in space.

We invite all of you to join us in the universe of possibilities that this most challenging of adventures brings with it. There is hard work to be done, opportunities to share and stories to tell.

Together we can all find out what happens next and at the Space Foundation we're just getting started.

Thank you.